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10/567,015	02/03/2006	Katsuyuki Arimoto	2006_0089A	9414
53349 7590 09/09/2009 WENDEROTH, LIND & PONACK L.L.P. 1030 15th Street, N.W. Suite 400 East Washington, DC 20005-1503				
EXAMINER				
CERULLO, LILIANA P				
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2629				
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09/09/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/567,015

Applicant(s)

ARIMOTO ET AL.

Examiner

LILIANA CERULLO

Art Unit

2629

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/07/2009 has been entered.

In the submission the Applicants amended claims 14 and 26, currently claims 14-26 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 14-16 and 23-26** are rejected under 35 U.S.C. 102(b) as being anticipated by Ohi et al. in US 5,547,688 (hereinafter Ohi).

4. Regarding **claims 14 and 25**, Ohi teaches a matrix-type display apparatus (Figs. 6, 7) which drives a display panel (LCD Panel Fig. 6) including a plurality of pixels (Fig.

7) disposed in matrix form (as shown in Fig. 7) and displays an image (col. 1 lines 11-22), comprising:

a converting portion (Fig. 6, elements 14-15) adapted to gamma-convert (Fig. 6, element 15) an input video signal (Fig. 6, RGB input signal 11), using n pairs of gamma-characteristics each made up of first and second gamma-characteristics (Fig. 6, elements 14-15, where three pairs are shown, each made of gamma-1 and gamma-2 for each one of R, G and B. Also note Fig. 5 where gamma-1 and gamma-2 are gamma curves i.e. gamma characteristics) different from each other (as shown in Fig. 5), the gamma-characteristics (gamma-1 and gamma-2 of Figs. 5-6) being a transmittance characteristic (col. 5 lines 25-39 and Fig. 2C where the gamma curves gamma-1 and gamma-2 are transmittance characteristics at different angles) according to an input level (V_{in} of Fig. 5); and

a selecting portion (Fig. 6, control 20) adapted to specify a transmittance (gamma characteristic of col. 5 lines 64-67) to be used for display (col. 5 lines 20-24 where the output voltage used for display of pixels in Figs. 6-7 has a specified [desired] gamma characteristic. Please note that specification of a transmittance, see Fig. 2C, results in a practical specification of a gamma curve according to viewing angle, see Fig. 5 and desired output voltage) based on the input video signal (V_{in} of Fig. 5 which is an input image signal per col. 4 lines 12-14), to select one pair of gamma-characteristics (gamma-1 and gamma-2 for either R or G or B in Figs. 6-7) from among the n pairs of gamma-characteristics (three pairs shown in Fig. 6) according to the specified transmittance to be used for display (as explained above, the specified transmittance

results in a specified gamma curve and output voltage of Figs. 2C and 5), and to select an output supplied to the display panel (Fig. 7) from among the $2n$ outputs (where $2n$ outputs are gamma-1 or gamma-2 for each RGB) which are gamma- corrected by said converting portion (Fig. 6, elements 14-15), so that a ratio between a first distribution area of pixels driven by the video signal gamma-corrected by use of the first gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-1 for either R or G or B in Fig. 7) and a second distribution area of pixels driven by the video signal gamma-corrected by use of the second gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-2 for either R or G or B in Fig. 7) is equal to a distribution area ratio specified in advance for the selected pairs of gamma-characteristics (Fig. 7 nth frame or Fig. 6 and col. 6 lines 53-59 referring to the first embodiment where adjacent pixel dots have different use different gamma conversion tables. Thus the ratio of number_of_red_pixels_with_gamma-1 to the number_of_red_pixels_with_gamma-2 is 1/1, and the same applies for green and blue).

5. Regarding **claim 15**, Ohi teaches wherein a block comprises $(n+1)$ pixels (from Fig. 6, $n=3$, thus $n+1=4$, which would include 4 pixels of the same color, for example in Fig. 7, first column, third column and two first rows, which are all red pixels will form a block of 4); and said selecting portion (Fig. 6, control 20) selects an output supplied to the display panel (Fig. 6, LCD panel) from among the $2n$ outputs (Fig. 6, six outputs which are either gamma-1 or gamma-2 for either R or G or B) which are gamma-

corrected by said converting portion (Fig. 6, elements 14-15), so that the ratio between the first distribution area and the second distribution area (recall that this ratio is the ratio of the number of pixels driven by gamma-1 and number of pixels driven by gamma-2 in Fig. 7, which is equal to 1/1) is equal to the distribution area ratio in the block (which is 4 red pixels : 4 pixels in a block or $4/4 = 1$).

6. Regarding **claim 16**, Ohi teaches wherein the ratio of the first distribution area per block with the area of the pixels per block (Recall that there are 4 pixels of the same color in a block, e.g. 4 red pixels in Fig. 7 as explained for claim 15. This ratio is therefore the number of red pixels driven by gamma-1 in a block of 4 red pixels, or $2/4$ in Fig. 7) and the ratio of the second distribution area per block with the area of the pixels per block (the number of red pixels driven by gamma-2 in a block of 4 red pixels, or $2/4$ in Fig. 7) for each pair of gamma-characteristics (recall that each pair is either for red, green or blue) are selected out of $k/(n+1)$ and $(n+1-k)/(n+1)$, where k is an integer of one to n (where $k=2$, thus $k/(n+1) = (n+1-k)/(n+1) = 2/4$).

7. Regarding **claim 23**, Ohi teaches wherein said selecting portion (Fig. 6, control 20) selects an output supplied to the display panel (Fig. 6, LCD panel) from among the $2n$ outputs which are gamma-corrected by said converting portion (Fig. 6, gamma-1 or gamma-2 for either R or G or B), in a pixel made up of a red-pixel, a green-pixel and a blue-pixel (col. 6 lines 20-22 and Fig. 7).

8. Regarding **claim 24**, Ohi teaches wherein said selecting portion (Fig. 6, control 20) selects an output supplied to the display panel (Fig. 6, LCD panel) from among the 2n outputs which are gamma-corrected by said converting portion (Fig. 6, gamma-1 or gamma-2 for either R or G or B), for each of a red-pixel, a green-pixel and a blue-pixel comprised by one pixel (Fig. 7).

9. Regarding **claim 26**, Ohi teaches a driving method for a matrix-type display apparatus (Figs. 6, 7) which drives a display panel (LCD Panel Fig. 6) including a plurality of pixels (Fig. 7) disposed in matrix form (as shown in Fig. 7) and displays an image (col. 1 lines 11-22), comprising:

a converting step (Fig. 6, elements 14-15) of gamma-converting (Fig. 6, element 15) an input video signal (Fig. 6, RGB input signal 11), using n pairs of gamma-characteristics which are made up of first and second gamma-characteristics (Fig. 6, elements 14-15, where three pairs are shown, each made of gamma-1 and gamma-2 for each one of R, G and B. Also note Fig. 5 where gamma-1 and gamma-2 are gamma curves i.e. gamma characteristics) different from each other (as shown in Fig. 5), the gamma-characteristics (gamma-1 and gamma-2 of Figs. 5-6) being a transmittance characteristic (col. 5 lines 25-39 and Fig. 2C where the gamma curves gamma-1 and gamma-2 are transmittance characteristics at different angles) according to an input level (Vin of Fig. 5); and

a selecting step (Fig. 6, control 20) of specifying a transmittance (gamma characteristic of col. 5 lines 64-67) to be used for display (col. 5 lines 20-24 where the

output voltage used for display of pixels in Figs. 6-7 has a specified [desired] gamma characteristic. Please note that specification of a transmittance, see Fig. 2C, results in a practical specification of a gamma curve according to viewing angle, see Fig. 5 and desired output voltage) based on the input video signal (V_{in} of Fig. 5 which is an input image signal per col. 4 lines 12-14), selecting one pair of gamma-characteristics (selecting gamma-1 and gamma-2 for either R or G or B in Figs. 6-7) from among the n pairs of gamma-characteristics (three pairs shown in Fig. 6) according to the specified transmittance to be used for display (as explained above, the specified transmittance results in a specified gamma curve and output voltage of Figs. 2C and 5), and selecting an output supplied to the display panel (Fig. 7) from among the $2n$ outputs which are gamma-corrected in the converting step (where $2n$ outputs are gamma-1 or gamma-2 for each RGB and Fig. 6 elements 14-15), so that a ratio between a first distribution area of pixels driven by the video signal gamma-corrected by use of the first gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-1 for either R or G or B in Fig. 7) and a second distribution area of pixels driven by the video signal gamma-corrected by use of the second gamma-characteristic of the selected pairs of gamma-characteristics (number of pixels driven by gamma-2 for either R or G or B in Fig. 7) is equal to a distribution area ratio specified in advance for the selected pairs of gamma-characteristics (Fig. 7 n th frame or Fig. 6 and col. 6 lines 53-59 referring to the first embodiment where adjacent pixel dots have different use different gamma conversion tables. Thus the ratio of

number_of_red_pixels_with_gamma-1 to the number_of_red_pixels_with_gamma-2 is 1/1, and the same applies for green and blue).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 17-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohi et al. in US 5,847,688 in view of Yamashita et al. in US 2001/0026258 (hereinafter Yamashita).

12. Regarding **claim 17**, Ohi fails to teach a block of one pixel where a first sub-pixel has an area S_a and the second sub-pixels has an area mS_a where $m > 1$. However, Yamashita teaches a display wherein a block comprises one pixel (Yamashita, Fig. 1 and para. 41):

each pixel of the display panel is made up of, as one pixel (Yamashita, Fig. 1), of a combination of adjacent sub-pixels with different light transmittances (Yamashita, para. 41), and in doing so, one pixel is formed by a first sub-pixel (Yamashita, Fig. 1, sub-pixel B) which has a first pixel area S_a (as shown) and a second sub-pixel (Yamashita, Fig. 1, sub-pixel A) which has a second pixel area S_b (Yamashita, Fig. 1, sub-pixel A

has an area S , which is 4 times greater than the area of sub-pixel B, thus $m=4$) so the luminance of each sub-pixel is proportional to the area (Yamashita, para. 42).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Yamashita's combination of adjacent pixels with different transmittance (Yamashita, para. 41) in Ohi's display (Ohi, Figs. 6-7), because Ohi already teaches that adjacent pixels have different transmittances (Fig. 7, two adjacent sub-pixels of the same color, e.g. red driven by gamma-2 in the third column and first line, and red driven by gamma-1 in the first column and first line. Please note that these sub-pixels are adjacent because the RGB pixels to which they belong are adjacent) and doing such combination would provide the benefit of increased high gray scale display in a color LCD (as taught by Yamashita in para. 67).

Consequently, upon combination, two of Ohi's sub-pixels of the same color driven with different transmittance (Ohi, Fig. 7, e.g. red pixel driven with gamma-1 located at the first column first line and, red pixel driven with gamma-2 located at the third column first line) will form one of Yamashita's pixel of Fig. 1 (e.g. Yamashita sub-pixel A will be driven by gamma-1, and the other sub-pixel, Yamashita sub-pixel B will be driven by gamma-2).

Therefore the selecting portion (Ohi, Fig. 6, control 20) would select an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the $2n$ outputs which are gamma corrected by said converting portion (Ohi, Fig. 6, six gamma values shown), so that the ratio of the first distribution area and the second distribution area (Recall that in Ohi, this ratio is the ratio of the number of pixels driven by gamma-1 and number of

pixels driven by gamma-2 in Fig. 7 for any given color, e.g. red. Upon combination this ratio is the same as Yamashita sub-pixel B to sub-pixel A or $1/4:4/4$) is equal to the distribution area ratio in the block (Yamashita Fig. 1, the distribution area ratio can be interpreted as area of sub-pixel B to area of sub-pixel A, or $1/4:4/4$).

13. Regarding **claim 18**, Ohi in view of Yamashita teach the ratio of the first distribution area with the area of the pixel (Yamashita, Fig. 1, the total area of the pixel is $5/4$, thus the ratio of the sub-pixel B with area $1/4$ is $(1/4) / (5/4) = 1/5$) and the ratio of the second distribution area with the area of the pixel (Yamashita, Fig. 1, the total area of the pixel is $5/4$, thus the ratio of the sub-pixel A with area 1 is $(1) / (5/4) = 4/5$) for each pair of gamma characteristics are selected out of $1/(m+1)$ and $m/(m+1)$ (as explained for claim 17, $m=4$. Then $1/(m+1) = 1/5$ and $m/(m+1) = 4/5$).

14. Regarding **claim 19**, Ohi in view of Yamashita teach wherein the second pixel area $S_b=4S_a$ (Yamashita Fig. 1, sub-pixel A with area S and sub-pixel B with area $S/4$) and that the transmittances are different by varying the pixel area (Yamashita para. 61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the technology available at hand and set the area of Yamashita's sub-pixel A to meet the relation of $1.5S_a \leq S_b \leq 3S_a$, as it was already Yamashita's intention to vary the transmittance and luminance of the sub-pixels by altering their area (Yamashita para. 61).

15. Regarding **claim 20**, Ohi fails to teach one pixel where a first sub-pixel has an area S_a and the second sub-pixels has an area mS_a where $m > 1$. However, Yamashita teaches a display wherein:

each pixel of the display panel is made up of, as one pixel (Yamashita, Fig. 4), a first sub-pixel (Yamashita, Fig. 4, sub-pixel R) which has a first pixel area S_a (Yamashita, Fig. 4, area 64 of sub-pixel R) and a second sub-pixel (Yamashita, Fig. 4, sub-pixel G) which has a second pixel area S_b (Yamashita, Fig. 4, area 65 of sub-pixel G, where sub-pixel R area 4 has an area S , which is 4 times greater than the area of sub-pixel G area 65, thus $m=4$) and that the luminance of each sub-pixel is proportional to the area (Yamashita, para. 42); and

a block comprises two pixels (Yamashita, Fig. 4, a block can be formed by pixel R and pixel G).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use Yamashita's combination of adjacent pixels with different transmittance (Yamashita, para. 41) in Ohi's display (Ohi, Figs. 6-7), because Ohi already teaches that adjacent pixels have different transmittances (Fig. 7, two adjacent sub-pixels of the same color, e.g. red driven by gamma-2 in the third column and first line, and red driven by gamma-1 in the first column and first line. Please note that these sub-pixels are adjacent because the RGB pixels to which they belong are adjacent) and doing such combination would provide the benefit of increased high gray scale display in a color LCD (as taught by Yamashita in para. 67).

Consequently, upon combination, two of Ohi's sub-pixels of the same color driven with different transmittance (Ohi, Fig. 7, e.g. red pixel driven with gamma-1 located at the first column first line and, red pixel driven with gamma-2 located at the third column first line) will form one of Yamashita's pixel of Fig. 1 (e.g. Yamashita sub-pixel A will be driven by gamma-1, and the other sub-pixel, Yamashita sub-pixel B will be driven by gamma-2).

Therefore the selecting portion (Ohi, Fig. 6, control 20) would select an output supplied to the display panel (Ohi, Fig. 6, LCD panel) from among the $2n$ outputs which are gamma corrected by said converting portion (Ohi, Fig. 6, six gamma values shown), so that the ratio of the first distribution area and the second distribution area (Recall that in Ohi, this ratio is the ratio of the number of pixels driven by gamma-1 and number of pixels driven by gamma-2 in Fig. 7 for any given color, e.g. red. Upon combination this ratio is the same as Yamashita sub-pixel B to sub-pixel A or $(1/4) / (4/4) = 1/4$) is equal to the distribution area ratio in the block (Yamashita Fig. 1, the distribution area ratio can be interpreted as area of two sub-pixels B to area of two sub-pixels A, or $(2 \cdot 1/4) / (2 \cdot 4/4)$ which is equal to $1/4$).

16. Regarding **claim 21**, Ohi in view of Yamashita teach wherein the ratio of the first distribution area with the area of the block (Yamashita, Figs. 1 and 4, the total area of the block is the area of two pixels in Fig. 4, or $2 \cdot 5/4$, where $5/4$ is the area of one pixel of Fig. 1. Thus the ratio of sub-pixels B driven by gamma-1 with total area $2 \cdot 1/4$, is $(2 \cdot 1/4) / (2 \cdot 5/4) = 1/5$) and the ratio of the second distribution area with the area of the

block (Yamashita, Fig. 1, the total area of the pixel is $2^{5/4}$, thus the ratio of the sub-pixels A with driven by gamma-2 with total area 2 is $(2) / (2^{5/4}) = 4/5$) for each pair of gamma characteristics is (Note that $m=4$, thus $2+2m=10$. Thus the $2/(2+2m)=1/5$ and $2m/(2+2m)=4/5$, which are the same as the ratios explained above).

17. Regarding **claim 22**, Ohi in view of Yamashita teach wherein the second pixel area $S_b=4S_a$ (Yamashita Fig. 1, sub-pixel A with area S and sub-pixel B with area $S/4$) and that the transmittances are different by varying the pixel area (Yamashita para. 61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the technology available at hand and set the area of Yamashita's sub-pixel A to meet the relation of $1.2S_a \leq S_b \leq 2S_a$, as it was already Yamashita's intention to vary the transmittance and luminance of the sub-pixels by altering their area (Yamashita para. 61).

Response to Arguments

18. Applicant's arguments with respect to claims 14 and 26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LILIANA CERULLO whose telephone number is

(571)270-5882. The examiner can normally be reached on Monday to Thursday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. C./
Examiner, Art Unit 2629

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629